Healthy People

in Healthy Places

NCIRD played a key role in 2006 by not only keeping individuals healthy, but by promoting health across a wide breadth of settings. From vaccines that protect communities through creation of herd immunity, to partnerships which keep healthcare professionals on the cutting edge of public health, to research that keeps institutions and workplaces safe, NCIRD is committed to ensuring that people are safe in their own communities, hospitals, schools, or as they travel.

Kids' vaccine has surprising protection for adults

THE BACTERIUM *Streptococcus pneumoniae*, also known as pneumococcus, is the most common cause of meningitis, pneumonia, and ear infections in the US. During the 1990s, the pathogen started becoming resistant to penicillin and several other antibiotics used to treat it.

The first pneumococcal vaccine shown to be effective in infants and children under the age of two years old was licensed in 2000. A high-profile publication in 2006 showed the enormous positive effect vaccine introduction has had on disease in young children, especially infections caused by strains that are resistant to antibiotics. The report included data from CDC's Active Bacterial Core surveillance (ABCs), part of the Emerging Infections Program Network that tracks serious bacterial infections in ten states.

The data showed that meningitis and bloodstream infections caused by resistant pneumococci fell 81% between 2000 and 2004, among children under five years of age, preventing approximately 8,000 fewer resistant infections in 2004 alone. One of the concerns facing NCIRD staff was the knowledge that a resistant strain not covered by the vaccine increased during this time, indicating that the organism continued to evolve, and that careful use of antibiotics remains important.

A surprise finding was that children were not the only ones to benefit from use of the new vaccine

approximately 10,000 fewer episodes of these serious resistant infections occurred. Further study indicated that vaccinating children was reducing spread of resistant pneumococcus, and thereby protecting adults from the infections; this effect is known as herd immunity—the indirect effects of vaccination.

To stay on the cutting edge of fighting pneumococcus, NCIRD has entered into a cooperative research and development agreement to develop a **brand-new**, innovative protein-based pneumococcal vaccine (different from the existing vaccine) that uses parts of the common *Streptococcus pneumoniae* protein, PsaA, as well as those of other protein antigens common in humans during colonization and disease, to reduce nasopharyngeal carriage of *S. pneumoniae*.

A surprise finding was that children were not the only ones to benefit from use of the new vaccine. **As more children were vaccinated with the new pneumococcal conjugate vaccine, ABCs data indicated that disease rates were also dropping in adults.** Older adults, such as those 65 years of age or older, are at high risk for complications and deaths from pneumococccal disease, as well as for infections caused by resistant strains.

In 2004 alone, bloodstream infections and meningitis caused by resistant organisms in this high-risk group fell 49% between 2000 and 2004, meaning

Further proof that immunization protects communities

Continuing protection for communities—routine childhood immunization saves billions

CDC recently evaluated the impact of seven vaccines (DTaP, Td, Hib, polio, MMR, hepatitis B, and varicella) routinely given as part of the childhood immunization schedule and found that vaccines are tremendously cost effective. The study is the first time the seven vaccines have been examined together and with a common methodology.

The study found the use of these seven vaccines will prevent more than 14 million cases of disease and more than 33,500 deaths over the lifetime of children born this year. When comparing the cost of the diseases they prevent and the cost of administering them, **these vaccines save nearly $10 billion per year**. These vaccines also prevent the need for patients to spend time seeking care, as well as the need for parents to take time off work to care for sick children. When including these and other prevented costs to society, **the annual savings exceed $40 billion**.

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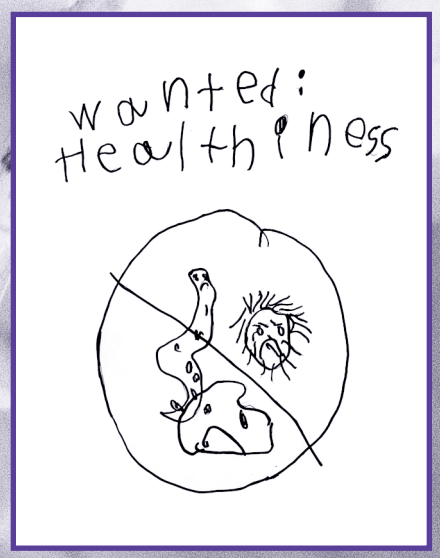
A child is protected from vaccine-preventable diseases after receiving a series of vaccines over time, and not just one shot. This economic evaluation is groundbreaking in that previous studies demonstrating the cost savings of childhood vaccination in the US have only focused on single vaccines. Thus, expanding beyond the single-vaccine, cost-benefit perspective provides policymakers better information about the economic impact of the immunization program by examining a routine seven-vaccine U.S. childhood immunization schedule.

The analysis will be helpful in understanding the economic effects of the immunization program under current circumstances. Administrators and policy makers may use the results to justify sustained support for programs, make needed modifications, and guide future programs. "Economic Evaluation of the 7-Vaccine Routine Childhood Immunization Schedule in the United States, 2001" appears in the December, 2005, edition of the *Archives of Pediatrics and Adolescent Medicine*.



Artwork courtesy of Skyler Gupta

PROTECTION FROM BACTERIA AND VIRUSES
Immunization provides hope for a world free from disease.

Real impact—vaccine-preventable diseases drastically decline

Comparison of 20th Century Annual Morbidity and Current Morbidity: Vaccine-Preventable Diseases

Disease	20th Century Annual Morbidity*	2005**	Percent Decrease
Smallpox	48,164	0	100%
Diphtheria	175,885	0	100%
Measles	503,282	66	> 99%
Mumps	152,209	314	> 99%
Pertussis	147,271	25,616	83%
Polio (paralytic)	16,316	1†	> 99%
Rubella	47,745	11	> 99%
Congenital Rubella Syndrome	823	1	> 99%
Tetanus	1,314	27	98%
Haemophilus influenzae	20,000	226‡	99%

* Source: CDC. *MMWR*, April 2, 1999. 48:242–264
** Source: CDC. *MMWR*, August 18, 2006 / 55(32);880–893
† Imported vaccine-associated paralytic polio (VAPP)
‡ Type b and unknown (<5 years of age)

Numbers above indicate at- or near-record lows in 2005 (except Pertussis).

Comparison of Pre-Vaccine Era Estimated Annual Morbidity and Current Estimated Morbidity: Vaccine-Preventable Diseases

Disease	Pre-Vaccine Era Estimated Annual Morbidity*	2005 Estimated Morbidity*	Percent Decrease
Hepatitis A	117,333	19,183	84%
Hepatitis B (acute)	66,232	15,352	77%
Pneumococcus (invasive)			
all ages	63,067	40,325	36%
< 5 years of age	16,069	4,400	73%
Varicella	4,085,120	817,024	80%

* Unpublished CDC data, reported November 2006

Community vaccine supply and demand

Who's vaccinated in a community? Immunization Information Systems key to assessing childhood vaccination status

Immunization Information Systems (IIS) are used to collect and consolidate vaccination data from multiple healthcare providers, to generate reminder and recall notifications for individuals, and to assess vaccination coverage levels. In 2005, more than 56 percent of US children under six years of age participated in an IIS.

For the first time, NCIRD was able to assess influenza vaccination coverage rates among children 6–23 months of age during the 2005–2006 influenza season in six IIS sentinel sites. Sentinel sites represent geographically contiguous counties or census tracts for which IIS data are collected on 10,000 or more children less than six years old, representing more than 95% of the population in that age group for that area.

The findings demonstrated that vaccination coverage varied widely among sites, with fewer than 23% of children in five of the sites being fully vaccinated. Use of IIS data helps to underscore and monitor the need for increased measures to improve the proportion of children who are fully vaccinated. As participation by providers in IIS increases and data quality improves, data from IIS will help improve the effectiveness and efficiency of immunization programs throughout the US.

Improving the distribution of public health resources across communities—how do you create a more efficient vaccine supply system?

Most methods and processes used to manage vaccines are derived from models put into place with the inception of the Vaccines For Children (VFC) program ten years ago, and some processes were first used as early as the 1960s.

However, over the past decade the number of children served and the number of doses of vaccine provided have increased dramatically. In addition, several vaccines have been added to the recommended childhood vaccination schedule. The processes that were adequate to manage and to serve participants decades ago are not sufficient for the public health needs of the 21st century. As a result of these concerns, the Vaccine Management Business Improvement Project (VMBIP) was created.

VMBIP is a way to simplify processes for ordering, distributing, and managing vaccines. The program will improve responses to public health crises related to disease outbreaks, vaccine shortages, and disruption of the vaccine supply. A more efficient vaccine supply system will, in turn, result in the redirection of public health resources from vaccine distribution to other critical public health activities that already have improved immunization coverage. Finally, the project will significantly reduce the lead time between orders for and delivery of vaccine and will enable the direct delivery of vaccines to providers.

Vaccine funds are now obligated against manufacturer contracts, enabling CDC to better match vaccine funds with grantee needs. A centralized distribution contract was awarded in September 2006, beginning with a focused pilot program. Using just a pilot program to begin with is designed to ensure that operational process issues are resolved prior to expanding the model to a large number of providers. The remaining projects will be added to the centralized distribution format in a phased roll-out. While management of a centralized funding process began in FY 2006, centralized ordering will begin the first part of 2007.

EXTREME VACCINE TRANSPORT
Varicella vaccine on dry ice at the bottom of the Grand Canyon.

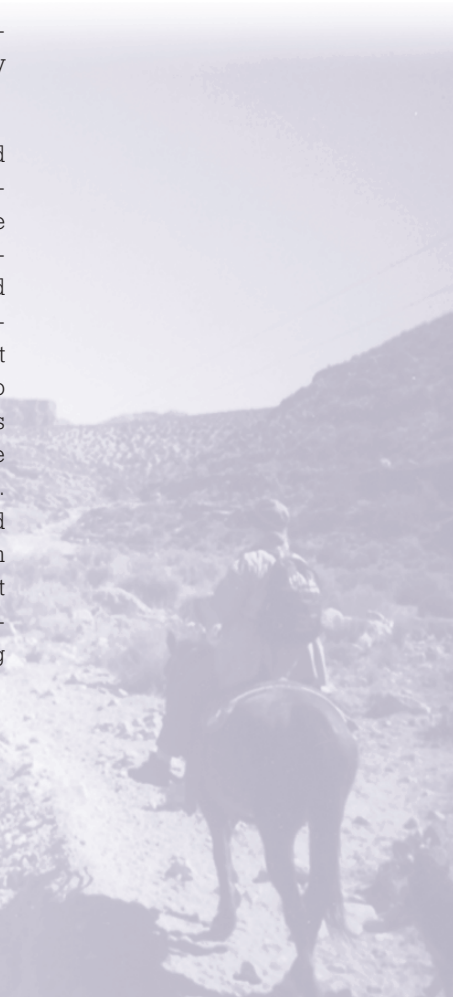


Photo courtesy of Arizona Department of Health Services

Training health professionals

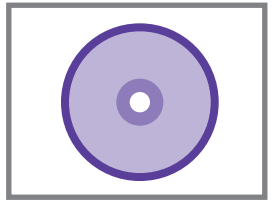
benefits a variety of communities in 2006

9,550

NCIRD's e-mail service, NIP INFO, answers questions from healthcare professional and the public within 24 hours, responding to 9,550 immunization-related questions.

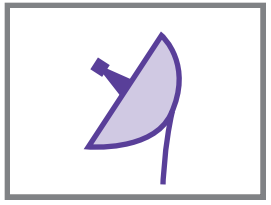
772,900

NCIRD Resource and Information Center distributed a wide variety of publications and resources, including 740,000 printed items, 30,000 CD-ROMs, and 2,900 DVDs.



14,204

NCIRD Immunization Services staff delivered 113 in-person presentations to 14,204 healthcare providers. Other training included three land-based courses, six satellite broadcasts, six NetConferences, and two web-based modules.

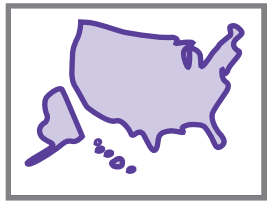


18,800

More than 18,800 healthcare professionals were awarded Countinuing Education (CE) credits for participation in NCIRD Immunization training programs.

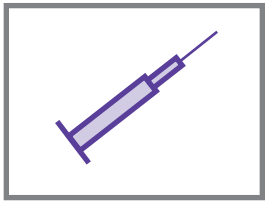
1,578

The fortieth National Immunization Conference was held in Atlanta, GA. The Conference was attended by 1,578 persons from all 50 states, some US territories, and several other countries.



7,000

NCIRD distributed 7,000 CD Vaccine Storage and Handling CD Toolkits to healthcare personnel who provide immunization services.



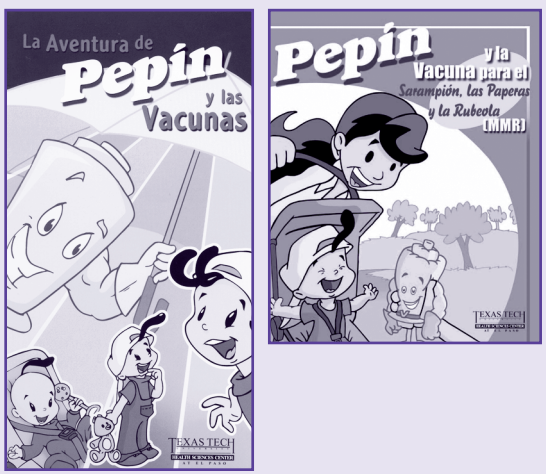
Working together to keep communities healthy

Community partnerships effectively promote immunization

African Americans and Hispanics have significantly lower influenza and pneumococcal immunization rates compared to the rest of the population. Influenza vaccination coverage among adults 65 years of age and older is 86% for whites, 48% for African Americans, and 54% for Hispanics. The disparity for pneumococcal vaccination is even larger. The hepatitis B infection rate can be as high as 15% in new immigrants from Asian-Pacific parts of the world, and the lifetime risk of infection for hepatitis B for them is 60%.

To improve immunization rates, NCIRD provided assistance in 2006 to National Minority Organizations (NMOs). NMOs provide technical assistance, training, and program support from within the target community. They are able to develop and provide culturally and linguistically sensitive educational materials, resources, and assistance—achieving greater acceptance from the target population.

The Migrant Clinician's Network (MCN), in collaboration with Texas Tech University, has developed an animated cartoon series called "Pepin" to promote childhood, adolescent, and adult immunization. These materials are designed to assist healthcare providers in public health clinics, private medical facilities, and schools, to explain the importance of immunization to their patients. Used in conjunction with other educational materials they have produced, such as immunization fact sheets, an immunization promotion calendar, and numerous articles in newsletters, MCN has reached out to the nationwide Hispanic population.



HEALTHY STORIES
Spanish language materials promoting immunization.

MCN materials have been requested and provided to more than 500 organizations in 45 states around the country. More than 70,000 Pepin series booklets, DVD sets, and supporting materials have been provided to community organizations that target Hispanic patients. Focus groups and other evaluations are expected to take place in 2007 to determine if attitudes and behaviors have been modified as a result of this campaign.

Primary care docs immunize across the lifespan—from babies to seniors

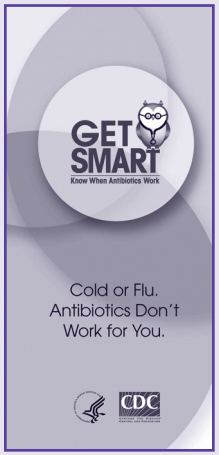
Every day, on the front lines of primary care, family physicians see patients across the lifespan who could benefit from vaccines. Family physicians have the challenge of keeping up-to-date with three different vaccination schedules (childhood, adolescents, and adults). At the same time, family physicians are in an enviable position; they can protect entire families at once against vaccine-preventable diseases.

The American Academy of Family Physicians (AAFP) is helping family physicians maximize opportunities to vaccinate and to protect families. As a trusted source for information for 94,000 family physicians and physicians in training, AAFP can have a measurable impact on immunization rates in the US.

To ensure AAFP's success in this life-saving mission, NCIRD is working alongside AAFP under an immunization cooperative agreement. AAFP has successfully enhanced its immunization electronic resources, including web links to NCIRD. As a result, direct member use of its immunization web resources has increased by 10%. In addition, the AAFP linked 49 local chapters that host their own web sites to the AAFP site, increasing member access to immunization information.

As of 2006, 43% of chapters are linked to the AAFP website, up from 16%. Through its weekly electronic newsletter reaching 68,000 members, AAFP members learn about outbreaks of vaccine-preventable diseases, vaccine shortages, and other potential crisis situations concerning vaccines or vaccine-preventable diseases. In the Fall of 2006, AAFP provided a special immunization mailing to every one of its members at the start of influenza season. The mailing highlighted NCIRD patient education materials and provided critical information about new influenza recommendations and standing orders. With many new vaccines on the horizon, and the opportunity to continue to protect families with existing vaccines, NCIRD will continue to work side-by-side with AAFP to promote immunizations to frontline primary care health providers.

Get Smart—know when antibiotics work



Educating communities about appropriate antibiotic use

In an effort to reduce rising rates of antibiotic resistance, the Get Smart campaign aims to promote adherence to appropriate prescribing guidelines among providers; to decrease demand for antibiotics for viral upper respiratory infections among consumers; and to increase adherence to prescribed antibiotics for upper respiratory infections. To fulfill these objectives, the campaign maintains active partnerships, provides a comprehensive CDC website, and organizes an annual conference of partners to discuss new directions for health education.

Today, more than 86 campaign partners and 23 funded state-based programs collaborate with the Get Smart campaign on projects, such as the development of educational curricula for medical students and residents, multicultural outreach, widespread educational material dissemination, and innovative community initiatives. One initiative in 2006 was the "Antibiotic Roundup" in Michigan to encourage consumer adherence to antibiotic prescriptions. This pilot program sought to mobilize consumers by asking them to bring expired antibiotics to pharmacies statewide for proper disposal. In addition to collecting hundreds of expired or unused medications, the Antibiotic Roundup was an opportunity to highlight the state-based antibiotic judicious use educational campaign.

"Get Smart In Action: Old Challenges, New Challenges, Innovative Solutions" was held May, 2006, in Atlanta, at CDC's "7th Annual Conference to Promote Appropriate Antibiotic Use." The goal of this 2-day event was to reduce antibiotic resistance through the promotion of appropriate antibiotic use. The participants in the conference represented state and local health departments, professional groups, academia, the scientific community, and many other organizations. Presenters spoke about the latest surveillance trends, gave policy updates, and delivered skill-building sessions for state-based program coordinators.

How do you communicate with communities about flu vaccination?

Before developing new educational materials to promote the new recommendation to vaccinate 24 to 59 month olds against influenza, the NCIRD Office of Communication Science first determined how to phrase this message to increase parent understanding.

Mall intercept interviews were conducted with over one hundred mothers of children ages seven and younger in Los Angeles, New York, Portland, and Colorado Springs. The interviews were conducted between June 29 and July 5, 2006, with African-American, Hispanic (Spanish- and English-speaking), and White, Non-Hispanic mothers.

The phrase "The CDC recommends that children 6 months and older get a flu shot every year until their 5th birthday" was the easiest for mothers to understand and was incorporated into campaign materials.

For a Spanish-speaking audience, the phrase was modified slightly to emphasize the need for an influenza vaccine each year: "El CDC recomienda que los niños de 6 meses y más hasta su 5to. cumpleaños reciban una vacuna contra la influenza o gripe todos los años [The CDC recommends that children 6 months and above until their 5th birthday get a vaccine against influenza or the flu every year]."

Keeping communities healthy

during flu season

2006 National Influenza Vaccine Summit—engaging the healthcare community to fight flu

NCIRD and the American Medical Association (AMA) co-sponsored two influenza conferences in January and June of 2006, for attendees from public, private, and non-profit stakeholder organizations.

During the January Summit, attendees identified, organized and prioritized critical issues; developed and organized Summit recommendations, and determined recommendation-based activities.

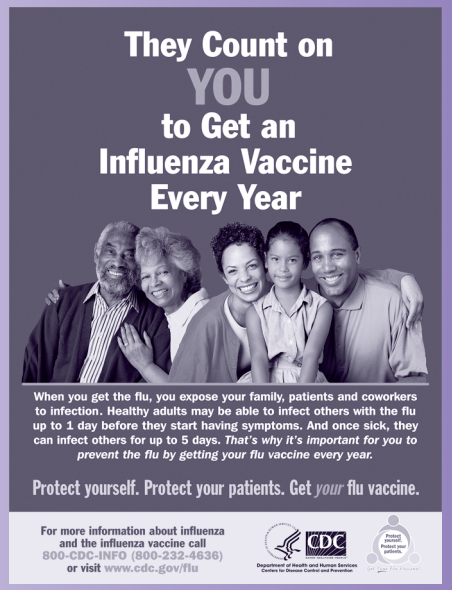
The June Summit addressed one objective: increasing influenza vaccine use. Over 100 million doses of influenza vaccine were projected for the 2006–2007 influenza season, and the Summit devoted the entire day to determining which activities would best achieve this objective. Six teams were established to work on these topics: healthcare workers, pediatrics, universal vaccination, vaccination season extension, provider tool kits, and partnerships. By the end of October 2006, many activities already were accomplished, with the remaining activities completed by the end of the 2006–2007 influenza vaccination season.

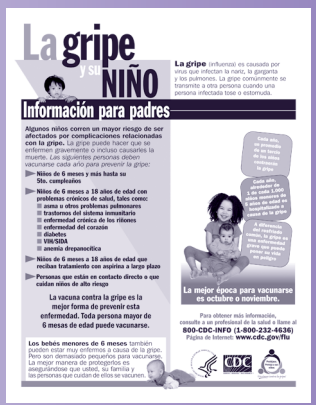
2006 kicks off the first annual National Influenza Vaccination Week

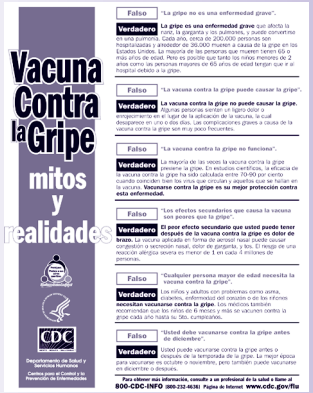
To help raise awareness of the importance of continuing influenza vaccination in November, December, and throughout the winter months, the US Department of Health and Human Services (HHS), CDC, the National Influenza Vaccine Summit, partners, and stakeholders presented the first annual National Influenza Vaccination Week (NIVW) beginning Monday, November 27, through Sunday, December 3, 2006. CDC encouraged state and local health departments, public health partners, and providers to plan vaccination clinics and influenza vaccine promotion activities. Free materials were available on CDC's website for easy printing from the "flu gallery," including posters, flyers, and educational handouts.

NIVW generated strong media interest, encouraging people to seek flu vaccination. CDC ads played in 96 markets, covering 67.44% of the US population, reaching a potential audience of over fifteen and a half million people, including Spanish- and English-speaking communities. An ad placed in a November issue of *USA TODAY* reached a potential audience of 2.2 million readers.

Added media exposure included live and taped radio and TV interviews, TV tags, Internet links on both Spanish- and English-language stations, banner ads on media websites, promotional information embedded in programming and at the top of programming, and talk show talent (*e.g.*, Dr. Isabel—Univision). Phone calls to the CDC hotline were at their highest level for the season during NIVW.







A GALLERY OF INFORMATION
Posters, flyers, fact sheets and other influenza vaccine communications materials are downloadable from the CDC website.

Preserving healthy institutions and healthy travel

Immunization—crucial for protecting vulnerable residents of long-term care facilities

An estimated 1.6 million to 2 million residents live in approximately 18,000 nursing homes in the US. Many are un- or under-immunized against influenza and pneumococcal disease. Based on 2004 National Nursing Home Survey data, only 63% and 45% of nursing home residents had received influenza and pneumococcal vaccinations, respectively. To reach the goal to raise these levels to 90%, all US nursing homes enrolled in Medicare/Medicaid programs as of October, 2005, must provide influenza and pneumococcal vaccinations to all eligible residents unless there is a documented medical contraindication, or residents or their families choose not to have the vaccine(s).

Based on CDC and partner efforts, information on resident vaccination status was incorporated into CMS's Minimum Data Set (MDS), collected on every nursing home resident in the US annually. This information will allow CDC and partners to monitor and to evaluate vaccination efforts; 2005 data currently are being analyzed.

In addition, it is important for long-term care facilities and institutions to monitor the introduction and spread of influenza among patients and staff. Knowing resident vaccination status will help facilities to rapidly initiate control measures to limit the health impact of outbreaks. CDC's Influenza Division has prepared additional instructions for institutions, including educating personnel about influenza and the importance of respiratory hygiene and cough etiquette; promoting proper hand hygiene; and providing routine guidance on the use of influenza antiviral medications and the need for infection control measures during an outbreak.

From home to abroad—Legionnaires' disease associated with travel

The environmental conditions needed for the transmission of *Legionella* exist in many travel-related venues, including showers, whirlpool spas, and decorative fountains in hotels, or on cruise ships. Symptoms of Legionnaires' disease can take up to 14 days to develop. Exposed travelers often return home before symptoms develop and clusters are unlikely to be detected by the same doctor or health department. Therefore, national surveillance is critical for detecting clusters of Legionnaires' disease among travelers.

NCIRD has taken several steps in 2006 to improve surveillance for travel-associated Legionnaires' disease. First, we are working with the Council of State and Territorial Epidemiologists (CSTE) to encourage all state health departments to obtain travel histories from all cases of Legionnaires' disease, and to report all travel-associated cases to NCIRD as quickly as possible. Second, we are encouraging the reporting of detailed travel information, including dates and destinations of travel, and names of hotels and cruise ships.

Thus, we can determine quickly whether a newly reported travel-associated case is associated with hotels or cruise ships previously associated with other cases. The new Legionnaires' disease website (www.cdc.gov/legionella) provides tools to state health departments, including case-report forms, questionnaires, and diagnostic testing information. Finally, NCIRD is communicating the importance of surveillance for travel-associated Legionnaires' disease through collaborative training activities with CDC's Vessel Sanitation Program and Division of Global Migration and Quarantine.

SURVEILLANCE ON LAND OR AT SEA
Dr. Rosalyn O'Loughlin and Dr. Gavin Grant examine a cruise ship's water supply.

Legionnaires' disease

associated with a healthcare setting

HOSPITALS POSE UNIQUE CHALLENGES for the prevention of Legionnaires' disease because they usually house patients at increased risk of the disease. *Legionella* can be inhaled through water as a mist or spray, causing pneumonia. Older, complicated plumbing systems often found in older hospitals are likely to be colonized with *Legionella* bacteria.

In May, 2006, NCIRD was informed of six confirmed cases of Legionnaires' disease among patients or visitors to a hospital. NCIRD was invited to work with state and local health department partners to identify the scope and source of the outbreak, and to recommend measures to interrupt transmission. A total of ten confirmed cases were identified, including five cases among inpatients at the hospital, and five cases among visitors to the hospital. An extensive epidemiologic investigation revealed that all cases had been exposed to the potable water system (*e.g.*, through showering, bathing, or drinking) of a **new** hospital building that was still under construction at the time of the outbreak. Samples collected from the potable water system of the new building revealed the presence of the same strain of *Legionella* as the one identified in the patients, confirming the transmission of *Legionella* from the water system to the patients. **An important lesson from this outbreak is that healthcare settings under construction may require disinfection** or other procedures to prevent colonization with and transmission of *Legionella* to patients in addition to the known risk of older buildings.

An extensive epidemiologic investigation revealed that all cases had been exposed to the potable water system

CONSTRUCTION OF AN OUTBREAK
Dr. Christina Phares samples the hospital's water system.